Please add new claims 38 and 39:

38. The method of claim 35, wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs a hydrogen bromide flow rate of from about 10 to 200 sccm.

39. The method of claim 35, wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs a hydrogen bromide flow rate of from about 10 to 200 sccm.

Remarks

Examiner Goudreau is thanked for the thorough Office Action.

Withdrawal of Claims

Applicant acknowledges the withdrawal of claims 19, 25 and 31 from consideration in accordance with the response to the Restriction Requirement mailed May 21, 2002. Applicant notes that it intends to file a continuation application directed to the substance of claims 19, 25 and 31 rewritten in independent form.

In the Claims

Allowed independent claims 35 and 36 have each been amended at lines 21 and 25, respectively, to replace "hydrogen bromide" with – bromine and/or chlorine containing etchant gas" to provide antecedent basis with lines 6, 7; and 8, 9; respectively, i.e. with "at least on of an active bromine containing etchant species and an active chlorine containing etchant species..." These amendments do not narrow independent claims 35 to 37.

Claims 2 to 5 and 22 have been amended to depend from amended allowed independent claim 35. Claims 8 to 10 and 28 have been amended to depend from amended allowed independent claim 36. Claims 13 to 15 and 34 have been amended to depend from amended independent claim 37.

Claims 17, 18, 23, 24, 29 and 30 have been canceled as their limitations are generally contained within allowed (amended) independent claims 35 to 37.

Independent claims 20, 21, 26, 27, 32 and 33 have been canceled to expedite prosecution of the application.

Claims 38 and 39 are new and have been added to better encompass the full scope and breadth of the invention notwithstanding the patentability of the

original claims. Claim 38 depends from amended allowed independent claim 35 and claim 39 depends from amended allowed independent claim 36.

Claim Rejections

The Rejection Of Claims 20, 26 And 32 Under 35 U.S.C. §103(a) as Being Unpatentable Over Soga (U.S. Patent No. 6,090,718)

The rejection of claims 20, 26 and 32 under 35 U.S.C. §103(a) as being unpatentable over Soga (U.S. Patent No. 6,090,718) (the '718 Soga Patent) is acknowledged.

Independent claims 20, 26 and 32 have been canceled to expedite prosecution of the application, mooting this rejection.

The Rejection Of Claims 2 To 5, 8 To 10, 13 To 15, 17, 18, 20 To 24, 26 To 30 And 32 To 34 Under 35 U.S.C. §103(a) as Being Unpatentable Over Soga (U.S. Patent No. 6,090,718) As Applied In Paragraph 19 Above, And Further In View Of Either Canale et el. (U.S. Patent No. 6,440,858) Or Su et al. (Article Entitled "Deep Trench Process Performance Enhancements In An MERIE Reactor")

The rejection of claims 2 to 5, 8 to 10, 13 to 15, 17, 18, 20 to 24 and 30 to 32 under 35 U.S.C. §103(a) as being unpatentable over Soga (U.S. Patent No. 6,090,718) (The '718 Soga Patent) as applied in paragraph 19 above, and further in

view of either Canale et al. (U.S. Patent No. 6,440,858) (the '858 Canale Patent) or Su et al. (Article Entitled "Deep Trench Process Performance Enhancements In An MERIE Reactor") (the Su Article) is acknowledged.

Claims 2 to 5 and 22 have been amended to depend from amended allowed independent claim 35; claims 8 to 10 and 28 have been amended to depend from amended allowed independent claim 36; and claims 13 to 15 and 34 have been amended to depend from amended independent claim 37; thus mooting this rejection against these claims.

Claims 17, 18, 23, 24, 29 and 30 have been canceled as their limitations are generally contained within allowed (amended) independent claims 35 to 37, thus mooting the rejection against these claims.

Independent claims 20, 21, 26, 27, 32 and 33 have been canceled to expedite prosecution of the application, thus mooting this rejection against these claims.

Allowable subject matter

The allowance of independent claims 35 to 37 is gratefully acknowledged.

Therefore the remaining claims (2 to 5, 8 to 10, 13 to 15, 22, 28 and 34 to 39) are submitted to be allowable over the cited references and reconsideration and allowance are respectfully solicited.

CONCLUSION

In conclusion, reconsideration and withdrawal of the rejections are respectively requested. Allowance of all claims is requested. Issuance of the application is requested.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

It is requested that the Examiner telephone Stephen G. Stanton, Esq. (#35,690) at (610) 296 – 5194 or the undersigned attorney/George Saile, Esq. (#19,572) at (845) 452 – 5863 if the Examiner has any questions or issues that may be resolved to expedite prosecution and place this Application in condition for Allowance.

Respectively submitted,

Stephen B. Ackerman

Reg. No. 37,761

Version with markings to show changes made.

Please cancel independent claims 20, 21, 26, 27, 32 and 33 to expedite prosecution of the application.

Please cancel claims 17, 18, 23, 24, 29 and 30 as their limitations are generally contained within allowed (amended) independent claims 35 to 37.

Please amend the claims as follows:

2. (Twice Amended) The method of claim 35 [21] wherein the substrate is employed within a microelectronic fabrication selected from the group consisting of integrated circuit microelectronic fabrications, ceramic substrate microelectronic fabrications, solar cell optoelectronic microelectronic fabrications, sensor image array optoelectronic microelectronic fabrications and display image array optoelectronic microelectronic fabrications.

3. (Twice Amended) The method of claim 35 [21] wherein the silicon layer is selected from the group consisting of monocrystalline silicon layers, polycrystalline silicon layers and amorphous silicon layers.

4. (Twice Amended) The method of claim 35 [21] wherein:

upon etching, the silicon layer is masked with a mask layer, and

the mask layer is selected from the group consisting of silicon containing dielectric hard mask layers and photoresist mask layers.

5. (Twice Amended) The method of claim 35 [21] wherein the seasoning polymer layer is formed of a material selected from the group consisting of:

silicon and bromine containing seasoning polymer materials;

silicon, bromine and oxygen containing seasoning polymer materials;

silicon and chlorine containing seasoning polymer materials;

silicon, chlorine and oxygen containing seasoning polymer materials;

silicon, bromine and chlorine containing seasoning polymer materials; and

silicon, bromine, chlorine and oxygen containing seasoning polymer materials.

8. (Twice Amended) The method of claim 36 [27] wherein the substrate is employed within a microelectronic fabrication selected from the group consisting of integrated circuit microelectronic fabrications, ceramic substrate microelectronic fabrications, solar cell optoelectronic microelectronic fabrications, sensor image array optoelectronic microelectronic fabrications and display image array optoelectronic microelectronic fabrications.

9. (Twice Amended) The method of claim 36 [27] wherein:

upon etching, the first monocrystalline silicon layer is masked with a mask layer; and

the mask layer is selected from the group consisting of silicon containing dielectric hard mask layers and photoresist mask layers.

10. (Twice Amended) The method of claim 36 [27] wherein the seasoning polymer layer is formed of a material selected from the group consisting of:

silicon and bromine containing seasoning polymer materials;

silicon, bromine and oxygen containing seasoning polymer materials;

silicon and chlorine containing seasoning polymer materials;

silicon, chlorine and oxygen containing seasoning polymer materials;

silicon, bromine and chlorine containing seasoning polymer materials; and

silicon, bromine, chlorine and oxygen containing seasoning polymer materials.

13. (Amended) The method of claim 37 [33] wherein the substrate is employed within a microelectronic fabrication selected from the group consisting of integrated circuit microelectronic fabrications, ceramic substrate microelectronic fabrications, solar cell optoelectronic microelectronic fabrications, sensor image array optoelectronic microelectronic fabrications and display image array optoelectronic microelectronic fabrications.

14. (Amended) The method of claim 37 [33] wherein:

upon etching, the polycrystalline silicon layer is masked with a mask layer; and

the mask layer is selected from the group consisting of silicon containing dielectric hard mask layers and photoresist mask layers.

15. (Amended) The method of claim <u>37</u> [33] wherein the seasoning polymer layer is formed of a material selected from the group consisting of:

silicon and bromine containing seasoning polymer materials;

silicon, bromine and oxygen containing seasoning polymer materials;

silicon and chlorine containing seasoning polymer materials;

silicon, chlorine and oxygen containing seasoning polymer materials;

silicon, bromine and chlorine containing seasoning polymer materials; and

silicon, bromine, chlorine and oxygen containing seasoning polymer materials.

22. (Twice Amended) The method of claim <u>35</u> [21], wherein the seasoned plasma reactor chamber cleaning step, when using an eight inch diameter substrate, employs:

a seasoned plasma reactor chamber pressure of from about 50 to 500mTorr;

a source radio frequency power of from about 100 to 200 watts at a source radio frequency of from about 2 to 13.56 MHz and a bias power of up to about 500 watts;

a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a nitrogen trifluoride or a sulfur hexafluoride flow rate of from about 10 to 500 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss.

28. (Amended) The method of claim <u>36</u> [27], wherein the seasoned plasma reactor chamber cleaning step, when using an eight inch diameter substrate, employs:

a seasoned plasma reactor chamber pressure of from about 50 to 500mTorr;

a source radio frequency power of from about 100 to 200 watts at a source radio frequency of from about 2 to 13.56 MHz and a bias power of up to about 500 watts;

a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a nitrogen trifluoride or a sulfur hexafluoride flow rate of from about 10 to 500 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss.

34. (Amended) The method of claim <u>37</u> [33], wherein the seasoned plasma reactor chamber cleaning step, when using an eight inch diameter substrate, employs:

a seasoned plasma reactor chamber pressure of from about 50 to 500mTorr;

a source radio frequency power of from about 100 to 200 watts at a source radio frequency of from about 2 to 13.56 MHz and a bias power of up to about 500 watts;

a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a nitrogen trifluoride or a sulfur hexafluoride flow rate of from about 10 to 500 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss.

35. (Amended) A method for forming an etched silicon layer comprising:

providing a first substrate having formed thereover a first silicon layer;

etching the first silicon layer to form an etched first silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides at least one of an active bromine containing etchant species and an active chlorine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing a bromine and/or chlorine containing etchant gas;

(2) the first silicon layer is etched to form the etched first silicon layer within the seasoned plasma reactor chamber; wherein the first silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a <u>bromine and/or chlorine containing etchant gas</u> [hydrogen bromide] flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first silicon layer to form the etched first silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second silicon layer to form an etched second silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

36. (Amended) A method for forming an etched monocrystalline silicon layer comprising:

providing a first substrate having formed thereover a first monocrystalline silicon layer;

etching the first monocrystalline silicon layer to form an etched first monocrystalline silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which

upon plasma activation provides at least one of an active bromine containing etchant species and an active chlorine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing a bromine and/or chlorine containing etchant gas;

(2) the first monocrystalline silicon layer is etched to form the etched first monocrystalline silicon layer within the seasoned plasma reactor chamber; wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a <u>bromine and/or chlorine containing etchant gas</u> [hydrogen bromide] flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first monocrystalline silicon layer to form the etched first monocrystalline silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second monocrystalline silicon layer to form an etched second monocrystalline silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

37. A method for forming an etched polycrystalline silicon layer comprising:

providing a first substrate having formed thereover a first polycrystalline silicon layer;

etching the first polycrystalline silicon layer to form an etched first polycrystalline silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides an active bromine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing a bromine and/or chlorine containing etchant gas;

(2) the first polycrystalline silicon layer is etched to form the etched first polycrystalline silicon layer within the seasoned plasma reactor chamber; wherein

the first polycrystalline silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a hydrogen bromide flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first polycrystalline silicon layer to form the etched first polycrystalline silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second polycrystalline silicon layer to form an etched second polycrystalline silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

Please add new claims 38 and 39:

-- 38. The method of claim 35, wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs a hydrogen bromide flow rate of from about 10 to 200 sccm.

39. The method of claim 35, wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs a hydrogen bromide flow rate of from about 10 to 200 sccm. --